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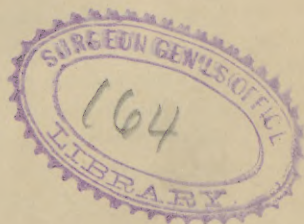
Extracted from the American Journal of the Medical Sciences for October, 1881.

THE NERVOUS SYMPTOMS OF LITHÆMIA.

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AMONG the subjects which have been of late more clearly recognized is that of lithiasis or lithæmia. Able researches have done much, decidedly, to direct the attention of the medical mind to it, and the outcome is that it is now distinctly known that a state exists which is closely allied to gout, a half-gout that does not bring with it the inflammation, pain, and obvious swellings of the gouty paroxysm, but which works more silently, is characterized by the abundance of lithic acid or lithates in the urine, frequently coexists with signs of ill-assimilation of food, and with aches and pains unaccompanied by any perceptible changes of the aching part. Hepatic derangement is also often found; and from this end of the chain the links are stretched through many vague, almost nameless, symptoms to outbreaks of true gout, or to structural change in heart, vessels, and kidneys. But it is not my object to discuss this relationship, and the mode of progress, nor the striking organic changes that are wrought. I shall confine myself to the less obvious, less known results which show themselves in the nervous system. This matter has long engaged my attention, and the more I examine it, the more I see these obscure phenomena becoming clear and demonstrating for themselves their true causation.

The first nervous symptom, connected with lithæmia, that I shall describe is *vertigo*. It is astonishing how many cases of vertigo turn out, on close investigation, to be thus caused; how persistent are the symptoms, how grave the apprehensions, until their true source is made out and the treat-

ment based on it; and how gratifying then the results of the treatment. Cases go on for years, some of them weighted down with the suspicion of organic cerebral mischief, more especially of tumour of the brain; lives are wrecked by the enforced abandonment of pursuits; the remedies employed are hurtful rather than helpful, until the hidden cause of the malady is discerned and by steady perseverance removed.

I will, by way of illustration, record three such cases of grave aspect and long standing.

CASE I.—A physician, 35 years of age, practising in a malarial district, himself a malarial subject, but not for some time affected with any distinct malarial outbreak, consulted me for violent attacks of vertigo; so violent and repeated that they interfered with the exercise of his profession; often was he obliged to lie down in his carriage, and at times staggered so in going to a house that, leaning against the front door for support, he would fall into the entry when the door was opened. He was rarely a day without an attack, although some were light; at times they were twice or thrice repeated in the twenty-four hours. His memory began to fail him; he was especially confused as to names, and was liable to use wrong words like an aphasic. At times a dull headache existed, but headache was on the whole neither a constant nor a prominent symptom; his vision was less acute than formerly. These symptoms had been going on markedly for a year, uninfluenced by quinia and other remedies, which he at first took under the belief that the disorder was malarial. Efforts to continue his professional duties increased his distress. He finally abandoned work, fully persuaded that he had an organic disease of brain or spinal cord, and alternating only in opinion between cerebral tumour, as he thought of the violent vertigo and of the headache, and locomotor ataxia, as his mind dwelt on the uncertainty of gait and the attacks of shooting pains in the limbs which every now and then happened.

When examined by me, I found no alteration of sensibility or of motion; the tongue was slightly coated at the back, the bowels were regular; the conjunctiva rather muddy, and with the faintest yellowish tint; no marked dyspeptic symptoms existed, or enlargement of liver or spleen, though the liver dulness was, perhaps, a little more extended than normal. The pulse was compressible, and occasionally lost a beat; there was no cardiac murmur. The appearance of the patient was that of distress, but not of anæmia. The joints of the fingers were somewhat tender on pressure. The urine was scanty, of high specific gravity, free from albumen, but loaded with lithates.

It was difficult to persuade the patient that he was not affected with a hopeless disease; that his symptoms were those of lithæmia, produced by overwork and the disordered state of the liver due most likely to malarial poison. He yielded reluctantly to the view of trying a strict diet, resting from work, exercising in the open air, and using alkaline purgative waters, followed by a course of small doses of arsenic. But he was glad he had yielded when health slowly, but steadily and fully, returning showed him the advantage derived from his submission.

The case I am about to relate was of much longer duration, and the time that has elapsed since the last attack shows how complete was the recovery.

CASE II.—A gentleman, 48 years of age, fond of intellectual pursuits, and leading the life of a student in addition to bearing the cares and anxieties of the responsible direction of heavy interests, has been at least for twelve years subject to attacks of vertigo, which distress him and demoralize him. Some years since he never passed a month without them; they come, when feeling well, or with but little premonition, simply that of a slight dyspeptic state; they come when on a strain, and when taking relaxation, though much more generally under the former than under the latter circumstances. The attacks are of about a minute's duration; he has had them at night awakening him out of his sleep; they are objective, and followed by a dull headache, which does not last longer than a day and sometimes only for a few hours. He is very gloomy after them, and for years his life was haunted by the idea that he was becoming an epileptic. This view was seemingly confirmed by rapidly passing spells, during which his mind was a blank and he would stagger in his gait, and he eyed with keen suspicion any companion in his walk, fearing that the dreaded secret was at last disclosed. Irregularity of the heart I found to be very common with him, the pulse some days intermitting every fourth beat, and on others only every twentieth. When the irregularity was most marked, these passing attacks of oblivion happened most decidedly. The intellectual faculties were always acute, but long spells of listlessness, requiring strong will power to force himself into exertion, were not infrequent. Dyspepsia occurred occasionally, especially of the acid type, but was not a marked symptom; the urine often deposited lithates, was of specific gravity ranging from 1020 to 1024, was free from sugar and albumen, contained lithates in abundance, and at times oxalates. The eye ground, examined by an ophthalmologist, was pronounced to be normal; it is right to add that the examination was made when there had not recently been vertigo. Slight sallowness of the skin and elevation of temperature, not exceeding one degree, were occasional symptoms, and joints of right hand at times tender on pressure, pain in the toes, and so-called rheumatism in the leg, some stiffness in walking, were also at long intervals observed.

Lithæmia existed in the family; the father had clearly suffered from similar symptoms, including the vertigo; a brother had the uric acid diathesis very marked, and had passed renal calculi of uric acid.

A system of active exercise, shower baths, regulated diet, produced very good results, so good that the attacks of vertigo happened only once in seven or eight months, while the dreaded slight suspensions of consciousness passed away altogether. But the cure was completed by a European trip, and the taking, while in Europe, of a course of Kissingen water. Two years and a half have elapsed since the last vertiginous seizure, and although there are still occasionally lithæmic symptoms, as regards the pain in the joints, and their soreness on pressure, the nervous symptoms have vanished; the action of the heart has become quite regular, the future seems as bright and promising, as before it was overcast and gloomy.

In the cases just described, the symptoms of gastric derangement were so slight and inconstant that they scarcely can be said to have been features of the disorder. I will now cite one, remarkable also for its seeming gravity, in which, however, early in the case at least, gastric symptoms were marked.

CASE III.—A gentleman, 38 years of age, tall, of fine physique, of nervous temperament, born of a family in which gout has been long hereditary, father, grandfather, and maternal uncles having been great sufferers by it, was in excellent health until October, 1878. He is temperate in his habits, fond of all outdoor exercises, an active walker and rider. In the autumn of that year, feeling the effects of the exhausting heat, he drank for a time Burgundy, but abandoned it when he began to perceive that it did not suit his digestion, and occasioned some aching in the joints. While regaining his usual condition, he was exposed to the vapours of turpentine in a newly painted house; an attack of vertigo resulted. From this time on for three months his life was a very miserable one. Four or five attacks of vertigo were often of daily occurrence, and he woke up with them at night, the floor and the bed seeming to dance around vigorously; he himself, however, never appeared to move, in other words, the vertigo was always objective. An attack lasted, it was thought, about two to three minutes; it was often followed by clammy sweat and by dull headache. The worst ones only were attended with sick stomach, or with the subsequent vomiting of a glairy and intensely acid mucus. A symptom as annoying as the vertigo was the staggering gait frequently produced; while walking, he would sway so as to have to cling to a lamp-post, and he, one of the most temperate of men, had several times to undergo the mortification of being taken for an inebriate.

He had no persistent headache, was greatly troubled with impaired eyesight; was obliged almost to desist from reading and from his ordinary pursuits; but bore his trials with unflinching courage. The heart acted normally, with an occasional intermission; he had at times shooting pains in his legs, and aches in the knuckles; the bowels were regular; the urine was habitually scanty, of specific gravity 1024, filled with urates, and occasionally with little cayenne pepper grains of uric acid. The gastric symptoms were in the first month or two very pronounced; they were of the form of a gastric catarrh with much acid dyspepsia. The impaired eyesight has been alluded to. An expert who examined the eyes carefully, pronounced them astigmatic, but stated that in addition there was decided enlargement of the retinal veins, a sort of varicose condition, and a spot of intense congestion in the right eye explaining the absolute blindness to objects in the lower right-hand quarter of the field of vision. In the left eye there was some varicosity of the veins, but no marked congestion; in neither eye-ground was choking of the disks found.

Another most distressing symptom was numbness of the left side, chiefly of the leg, sometimes of the arm and the side of the face. It bore no relation to the vertigo, was apt to occur in paroxysms of from three to five minutes' duration, during which the sensibility of the skin was somewhat impaired, at other times the æsthesiometer detected no abnormal condition.

Some improvement took place under treatment, especially under the strict diet, the use of small doses of Hunyadi water in the morning, and of corrosive sublimate between meals. The gastric symptoms were certainly much benefited, the vertigo happened less frequently, yet scarcely a day passed without some attack, even if slight. A sea-trip was then decided on; and he sailed for Europe in January, 1879. The effect was admirable and immediate, at least, on the vertigo. He had but one seizure, which occurred while passing through Paris, at the end of January. But his other symptoms did not at once subside. On the contrary, headache, which had been a very inconstant, almost absent symptom, while

here, became a prominent one; and more or less dull pain in the head with not infrequent attacks like those of nervous sick headache were common; the swaying, too, by no means ceased, and was, like the headache, for a time aggravated by visiting the picture galleries of Northern Italy.

Pains in the limbs, cramps and aches, even slight swelling in the knuckles, with uric acid deposits in the urine, also happened from time to time. Sugar in any abundance, malt extract, and all wines, except the light red wine of the Riviera, made these symptoms worse, or at once developed them, if they had been absent. Eschewing all wines and great care in diet, especially with reference to saccharine substances, much exercise in the open air in some of the health resorts of the south of France, produced amelioration so decided that he returned home in the autumn well to all appearances, although still a little troubled with the headache and the swaying in walking. Since January, 1880, these have passed off entirely, and while careful about taking enough exercise and about his diet, he is as well as ever he has been. His eyes, too, have greatly improved; when under active exercise and free from care, he can read without glasses, and has had at times glimmering of vision in the spot in the right eye which seems deprived of it.

Reviewing the features which these cases have in common, and taking into account many other instances which I have seen, what I shall call *lithæmic vertigo*, may be, I think, thus described. It is a giddiness frequently repeated; often there are several attacks daily for a few days, and then there is a much longer interval; it may occur at night. It happens irrespective of exertion, although long continued fatigue, especially in reading and writing, excites it; so does mental worry. But anything that aggravates or induces the lithæmic state develops it most promptly. Special articles of food do so; and I have had patients in whom a few glasses of hock, or a single glass of Burgundy or champagne, are sure to cause it the next day. The vertigo is objective, not subjective,—objects seem to whirl around the sufferer, not he himself to move. The giddiness is not associated with loss of consciousness, or this is so temporary that the patient is able to retain his position or speedily to regain it. Still he has to hold on for support to surrounding objects, and I have known him brought down on his knee before it is over. From the alarm and distress which attend it, it is very difficult to form an idea as to its duration. Notwithstanding the exaggerated statements made by the sufferer, to whom the seizure seems terribly long, it is safe to say that it rarely lasts more than a minute or two, and frequently less than a minute. It may come on without warning, or be preceded by a sense of emptiness of the head, by specks floating before the eyes, by dimness of sight. When it has set in, sudden change of position is apt for the next few days to develop it at once, although, perhaps, this is not more marked than in any form of vertigo. It may or may not be followed by headache; generally it is only followed by a sense of discomfort in the head, or by a dull ache of short duration, and, as in Case III., it may be noticed that when the headache in lithæmia becomes a marked symptom, the vertigo is infrequent.

When often repeated, it produces effects on the special senses. Sight is less acute, the field of vision is limited in size; letters look blurred, and there may be inability to see more than two or three letters in a word, or double vision may occur. One eye, or part of one eye, may be temporarily blind; and the ophthalmoscope detects marked congestion, especially fullness of the veins. When no attack has happened for some time, the eye-ground, as in Case II., is found to be normal. Long continued and frequently repeated attacks may give rise to some persistent changes, though never to choking of the disk. It would be unfair to leave the impression that these changes are all the result of the vertiginous seizures. In part, at least, they belong to the lithæmic state itself, and may be caused by it. But the whole matter is new and not worked out; and I invite the attention of ophthalmologists to this promising subject.

The sense of hearing is sometimes impaired for a day or two, and buzzing in the ears is complained of. These phenomena, too, may follow attacks of vertigo, or occur when the patient is only markedly lithæmic, and has not been dizzy.

I have in the cases described alluded to the momentary suspensions of consciousness, the sensations of lightness in the head, with a dark shade passing over the eyes, which are, in my experience, very common, and are dreaded by physicians especially, when afflicted with the disorder, as the precursors of epilepsy. The sense of terror and of fear occasioned is quite inconceivable to one who has not heard these attacks spoken of by a victim. They happen in those who at other times have had distinct vertigo; they are not at the time combined with giddiness, but produce a staggering or swaying, from which recovery is so quick that the disturbance mostly passes unperceived. Again, uncertainty of gait may take place for a long period without any of these signs of brain disturbance. In Case III. it lasted for a year after the vertigo had ceased.

As regards the cause of the vertigo, it is likely that the disorder is produced by the impure lithæmic blood. Whether this acts on the vaso-motor nerves and through them on the cerebral circulation, or primarily on some nerve-centre, must remain for the present a matter of pure speculation. It would not be difficult, following the ingenious reasoning of Woakes, concerning stomach vertigo, to connect the disturbance through the pneumogastric nerve and the lower cervical ganglion with the vertebral artery supplying the labyrinth and adjacent structures. But we must then assume as certain that a disturbance of this is always the cause of giddiness, and that the lithæmic process is invariably connected with a fault in the liver.

Gastric vertigo has just been mentioned, and doubtless it will be thought that the symptoms described are those of gastric vertigo. So they are in many respects; except that, for the most part, there are no gastric symptoms, or but passing gastric symptoms in lithæmic vertigo, while the

evidences of the lithæmic state are the marked features, or soon become so. Indeed, the error has been the other way; lithæmic vertigo has been confusedly included with gastric vertigo, from which we must learn to separate it. This is best done, as just indicated, by dwelling on the comparative absence of the stomach symptoms, and on the evidence presented of lithæmia. But there are unquestionably mixed cases, which it is not easy to analyze.

Headache is not, on the whole, a prominent symptom of lithæmia; that is, persistent headache is not. A dull feeling in the head, especially frontal, much more rarely occipital, happens at times for a day or two, if the digestion be specially disordered; or occurs as a morning headache, or, as already mentioned, for a few hours after an attack of giddiness. But severe acute periodical headaches of neuralgic type are common. They are very much like migraine, except that the bilious vomiting and signs of gastric disorder are far less prominent. They are localized, are increased by noises and by motion, and are frequently accompanied or followed by a heavy deposit of red sand in the urine. This is the way the attack relieves itself, and it suggests a strong analogy with what has often been noticed, that gout in the joints and migraine are prone to happen in the same person, the violent headache ending when the gouty swelling begins.

Neuralgia is a very common complaint in lithæmic subjects, and there is no nerve in the body that can ache which is exempt. Brachial neuralgias with pain shooting down the forearm to the tips of the fingers, intercostal neuralgias, sciatic neuralgias, are very common; neuralgia of the tongue happens; and in women neuralgia of the breast is not rare. The only neuralgia which I have found infrequent, is the one which might be supposed to be the most frequent, that of the fifth nerve; still it, too, may be encountered. Women are, I think, more subject to lithæmic neuralgia than men; we do not absolutely meet with more cases than in men, but this is because lithæmia affects so many more men than it does women.

The sciatic neuralgia may seize upon one or both nerves. There are often paroxysms of pain of three or four days' duration, and lulls of at least as long. This may go on for several months unless checked by treatment for the constitutional state. Sometimes the attack relieves itself by gravel in large quantities being passed. When the disorder is protracted, it may well be, in these lithæmic neuralgias, that the uric acid, irritating and perhaps being deposited in the nerve sheaths, leads to a secondary neuritis. The comparative infrequency of trifacial neuralgia has been alluded to. What is generally called facial neuralgia are cases like this, which at the same time illustrates the form of neuralgic headache above mentioned.

CASE IV.—A professional man, 48 years of age, portly in appearance, consulted me with reference to violent attacks of neuralgia and vertigo. The attacks of neuralgia frequently happened every day for some time. They are not, however, in the course of the fifth nerve, and it is more correct to

describe them as severe lancinating, paroxysmal headache, the pain felt on both sides of the head, especially of the forehead, followed by a little general soreness of these parts, but without localized tenderness in the trifacial. At times there are violent attacks of gastralgia, as violent as the head pains, and apt to take their place. He often has sleepless nights, gets up frequently to pass water, and his restlessness makes him an early riser. He is not a dyspeptic, except that he is at times annoyed with acid eructations; the tongue is clean. The urine is voided in full, rather large, quantities. It has an acid reaction, a specific gravity of 1014, no albumen or sugar. Examined under the microscope, there are urates, and also a large amount of free uric acid, with some epithelium. The pulse is compressible, about 75, easily influenced by emotion and fatigue; the first sound of the heart is short; the second very distinct. The vertigo and the headache are the only cerebral symptoms; the latter is not constant, but disappears for weeks and then returns in those violent outbreaks like neuralgia. These are sometimes terrible, and last, with their fierce exacerbations of several hours' duration and their remissions, for one to two weeks at a time. A half pint of hock will at once provoke the frightful headache, and frequently at the same time pain in the big toe. Aconite and morphia, salicylic acid, but particularly iodide of potassium and colchicum, have relieved the head pains. There are depression and irritability of temper, and want of energy, but these are far from constant, and occur irrespectively of the pains. In bracing mountain air, and taking exercise, he is always well. The attacks of vertigo have been very severe, although they are not frequent; they are chiefly morning attacks, most apt to occur on first rising. A striking feature of the case is the inability to keep warm, and the coldness of the extremities; but this is largely subjective. Yet, the state of the skin is not quite normal; the sensibility is not acute. The two points of an æsthesiometer on the finger tips are not sharply felt, nor correctly appreciated when at all close together. There is the clearest history of hereditary gout. Father, grandfather, great-grandfather, and the mother's father, all had been gouty. He himself has never had an attack.

Under systematic skin friction, moderately active exercise, occasional saline purgatives, restricted diet, mild alkaline diuretic waters, this gentleman improved greatly, and headache and vertigo were strikingly influenced. Oxide of zinc, two grains three times daily, was also taken for a time, and it was thought with decided benefit.

The next case illustrates a most violent form of intercostal neuralgia, finally cured by remedying the lithæmic state.

CASE V.—A physician, 33 years of age, of good constitution and general health, except repeated attacks of left-sided, trifacial neuralgia, occurring every week or ten days since childhood, and expending their force on the supra-orbital branch. Never had malaria, syphilis, acute rheumatism, or gout. Is a moderate eater, and temperate in his habits, using occasionally a little whiskey after dinner and supper, at no time exceeding three ounces in all. There is no hereditary disease, his father is living affected with shaking palsy. Practising in a mining district, there was much hard work and exposure, but his health was fairly good until his return to the city after a three years' absence. Soon, he began to be attacked with what was at first looked upon as pleurodynia on the left side; it was finally relieved by blistering and by a course of iodide of potassium

and cod-liver oil. For a year or two headaches happened, also generally relieved by the iodides.

In the spring of 1878 he first felt a burning aching pain between the shoulders, extending to the occiput. The pain increased gradually, involved a considerable portion of the left side of the chest, which became sore, and very tender spots could be distinctly made out in the course of the intercostal nerves. There was loss of appetite, and of flesh, constipation, and profound melancholy.

The salicylates, quinia, colchicum, the iodides were taken without relief; nothing did good but a trip to Florida of three months, and exercise in the open air; the pain and all the other symptoms disappeared. But on returning home they soon came back, the melancholy was intense, the chest pains were most violent. These were relieved by the thermocautery applied along the spine over the site of exit of the aching nerves. Yet the relief did not last, and when I saw the patient about two months afterwards, he had severe pains and aches in the dorsal and pelvic girdles. The pains were acute and in paroxysms, there were distinct tender spots to be made out in the course of the nerves; the intercostal trunks previously affected were only slightly disturbed; the pain at times shot along the sciatic nerves of one or both legs, and was combined with very considerable diffused muscular soreness. Not the least evidence of stiffness, swelling, or redness of the joints existed, and no fever. The body pains, which were aggravated in paroxysms, were worse in the evening and early morning and in damp weather. They often ceased when attacks of trifacial neuralgia happened. There was very slight dyspepsia, a clear tongue, some constipation, only trifling loss of flesh, but foreboding of evil, with refined self-torture, and a melancholy as great as I have ever met with. The mental faculties remained good, except some impairment of memory; reasoning was keen on the false facts which the gloomy self-inspection furnished. The heart was slightly accelerated, at times irregular, the first sound short, lacking weight, the second sharp. He passed but little over one pint of urine in twenty-four hours, of specific gravity 1023, free from albumen and sugar; acid, containing a great excess of urates. The urinary examination repeated several times gave much the same results, specific gravity ranging from 1023 to 1028, abundant urates, uric acid forming readily and in abundance, but only after urine acidulated with nitric acid was allowed to stand, dumb-bell and octahedral oxalates in moderate amounts.

I placed this patient on a diet of vegetables, fish, stale bread, and white meats, even these only in moderation; I forbade all stimulants; I insisted upon a certain amount of daily exercise and skin friction, and directed him to drink Poland water freely, to keep the bowels soluble, and to take oxide of zinc, two grains three times daily. After about a month of this treatment he reported himself very much better. In place of passing only a pint of urine daily, he passed three pints, of specific gravity 1017; he had hardly any dyspepsia, his tongue was clean. There had been some attacks of neuralgia, and a little pain in the great toe joint, worse before a rain storm, but they had not been very severe. For one attack of sharper and more protracted character, he took large doses of quinia with the same negative results as on former trials. Colchicum did much more good. He remained comparatively well, his spirits rallying with his improving health, until early in April, when he had a terrible seizure of left-sided intercostal neuralgia. Opium inter-

nally, hypodermics of morphia, and of morphia and atropia, cannabis, and chloral gave but very temporary relief; the attack had been going on for nearly two weeks under this treatment, when I directed him to take $\frac{1}{100}$ th of a grain of aconitia. He took three doses in twenty-four hours, it produced its physiological effects. The pulse sank to 52, was slightly intermittent, a feeling of numbness spread all over the body, and the neuralgia vanished. For a month afterwards he was entirely free from pain, pursuing his treatment with zinc, subsequently with small doses of arsenic, but always drinking freely of diuretic alkaline waters, using natural purgative waters from time to time, and keeping up the strict diet. The arsenic was not long continued, as it did not seem to suit his digestion. He has had but one bad attack of intercostal and dorso-abdominal neuralgia since. Aconitia influenced it, but not as decidedly as in the first trial; hypodermics of morphia and atropia relieved the pain, and the attack, much shorter than usual, lasting only three or four days, was broken up by free purgation with gamboge. At its height and at its decline, the urine, as usual in these seizures, was filled with heavy sandy deposits. The patient is now well, he has been to the seashore; he has gained flesh. He is careful in his diet, takes no medicine, and is cheerful and happy.

One of the most common forms of lithæmic neuralgia is *gastralgia*. It does not differ in its manifestation from ordinary *gastralgia*, except that it is associated with evidences of lithæmia, and that it is very apt to alternate with other neuralgias. It goes on unrelieved, until its source is detected and removed, and then yields entirely, to return perhaps only at long intervals, if at all, unless depressing care, work, or indiscretions in diet actively re-develop the constitutional fault which underlies it. It leads to emaciation, and is the source of much anxiety; and many is the case I have seen of supposed ulcer or cancer of the stomach which was lithæmic and recovered.

Here is a typical instance, selected from many.

CASE VI.—A gentleman, 40 years of age, had been for two years a great sufferer with violent and oft repeated attacks of cramps in the stomach. While for six months in southern Europe, the disorder almost ceased. The pain now is very severe, lasting, with slight remissions, for about an hour; it is sometimes started by eating, but it is neither necessarily caused nor made worse by taking food. The tongue is clean; the digestion, except for the pain, good. During, and more particularly after, an attack of pain, soreness at the epigastrium is noticed; no tumour can be felt; the abdominal aorta throbs a great deal; there are no murmurs. The patient has been thought to be labouring under gastric ulcer, while abdominal aneurism has also been diagnosticated. There is an old, but not marked history of malaria, none of syphilis. Considerable loss of flesh has happened. At times aching pains in the fingers are complained of. The urine is very acid, high coloured, free from albumen, but full of lithates, and frequently deposits heavy red sand, and shows in abundance crystals of uric acid. I made the patient watch these deposits, and found that their occurrence almost invariably coincided with, or followed the attacks of gastric pain, and when these were frequently repeated and decided, the appearance of the urine could be correctly predicated. A care-

ful diet, with a good deal of milk food, rest from laborious pursuits, saline aperient waters, and the steady use for about one month of the citrate of lithium, broke up the painful disorder. A course of arsenic afterwards completed the cure.

Cramps in the legs and muscular twitchings are often met with in those suffering from lithæmia. The former are apt to come on at night, and are very annoying and painful. They particularly affect the gastrocnemii muscles, and occur much more often in winter than in summer. In one of my patients cramp under the inner surface of the instep is as frequent as in the calf muscles; in another, muscular twitchings of the face are also produced when the lithæmic state is marked. Irregular choreic movements I have also seen in children, and they would be very much more common were the disease more common in childhood. Yet if we look for it we may find it oftener than we suspect. I have now under observation a bright young fellow of eleven, inheriting gout through several generations, with most marked lithic acid diathesis and nervous symptoms; the tendency to irregular muscular movements is only kept in check by rigid attention to diet. *Pains and perverted sensations* are also among the symptoms of lithæmia. Pain in the fingers, in the feet, without being necessarily associated with aching joints, pain in the tendo-Achillis, in the breasts, near the shoulder blades, and in women, at the coccyx, pains in the legs, thought to be rheumatic, and attended with some muscular soreness and stiffness of gait, are often encountered; so are burning sensations of the tongue, and burning of the palms and of the soles. These localized flushings in hands and feet are attended with a very slight elevation of temperature. The general temperature is but little influenced by lithæmia; I think never raised more than a degree to a degree and a half, even during the general hot spells, of which there may be complaint. One of the most singular abnormal sensations is that of great fulness and rather pleasant warmth in an entire leg from the knee down, not accompanied by any sense of burning of the skin. All these perverted sensations are not persistent, but they recur often.

Anæsthesia is also a symptom of lithæmia, though not a common one. I have never found it very extended, but generally localized to an arm or leg, or part of the thigh, or, what is not unusual, on corresponding parts of both arms and legs. It may affect the face and the lips, and those in whom it happens who have headache as a more than ordinarily prominent symptom, have told me that the disordered sensation was on the side opposite to the headache. The sense of numbness is greater than the actual loss of sensibility is found to be. Still, there is some loss of sensibility, less keenness of appreciation of sharp points, inability to distinguish the two points of the æsthesiometer with readiness. One of my patients tells me, that when suffering from the numbness in the lips he can bite the lips without feeling it. The numbness may be associated with formi-

cation or a sense of pricking. It is a persistent symptom in so far that while the lithæmic state lasts, it remains where it has been noticed, but it dwindles down at times to very little, and increases markedly at others. Free purgation always benefits it greatly; faradization with an electric brush improves it, and it will gradually disappear under strict diet, exercise, and remedying the lithæmic state; but recurrences are not uncommon.

In this case it was very marked:—

CASE VII.—Miss S., age 38, inclined to corpulency, has been under my observation for eight years, originally for blood-spitting following an attack of acute bronchial catarrh and pulmonary congestion. She has suffered a great deal from torpor of the liver, at times from acid indigestion, and frequently passes urine loaded with lithates. Aching in the joints and shooting pains in the limbs are also common, and nervousness and sleepless nights. But the most singular feature of her case is a perverted sensibility of the skin, a sense of pricking associated with great numbness. This is limited to the hands and forearm, it may be on one side, it may be on both. There are times when it is absent for months; it is apt to come on in spells lasting in a very decided manner from four to six weeks, and during its continuance, the symptoms of acid indigestion, of sluggish action of the liver, of uric acid deposits in the scanty urine, of aching hands, are apt to be at their height; or it supersedes, as it often long outlasts, these. A blue pill, followed by salines, always strikingly moderates it. It is not a purely subjective sensation; for when very marked an æsthesiometer shows defective tactile sense; when light, it is difficult to say that there is any lost cutaneous sensibility. There is no disorder of the heart or uterine functions; the urine, except the lithates or crystals of uric acid, presents nothing abnormal. Care in diet has had a decided influence on the troublesome symptom, the greatest relief has followed the use of laxatives, and the administration of citrate of lithium, which has increased the flow of urine and altered its acid character.

Other nervous symptoms are sleeplessness, sensitiveness to sounds, great susceptibility to odours. The *sleeplessness* is a very distressing symptom. Bromides and chloral have a good temporary influence on it, but it is best removed by purgatives and diet. Wine generally aggravates it; and so do such articles of food as readily induce the lithæmic state. The *sensitiveness to sounds* is especially annoying in those who have headaches, and loud sounds add not only to these, but provoke or increase the irritability of temper. Undue *susceptibility* to odours shows itself on many occasions. The odour of the magnolia causes headache; that of turpentine is mostly very unpleasant, and I have known it to excite headache and vertigo. A certain *nervousness* which may pass into hysteria is also among the symptoms of lithæmia. I have twice seen in man hysteria from lithæmia; and I am very certain that the hysterical symptoms of women no longer in their youth, and which are attributed to nervous break downs, to menstrual disorders, to approaching change of life and the like, are often really of lithæmic origin, and curable by the treatment which removes the constitutional cause. There are also among the rarer mani-

festations of lithæmia *reflex pains and aches*, for which there is nothing to account, or which are only partially explained by the direct action of the acid urine. To the former belong the pains and sensitiveness in the region of the heart, while this organ shows nothing abnormal except perhaps an occasional intermittency; a distressing itching of portions of the skin, nothing being visible. The latter is illustrated by this case:—

CASE VIII.—G., age 35, a man of extremely nervous temperament, son of a father with lithæmic symptoms; has had a great deal of care falling on him early in life. Has suffered much from mental depression and almost hysterical outbreaks of nervousness. Sleeplessness and irritability of the heart were also among the symptoms; all of which were aggravated by worry and relieved by long absence from home, especially in mountainous regions, and by horseback exercise. Vertigo has happened occasionally, early in the case, which has been going on for five or six years; but it has never been a marked feature. Early in the case, too, gastric symptoms, coated tongue, some acid indigestion were observed, and this led to the long trial of an almost exclusive milk diet for several years with the result of influencing the digestive condition favourably, but having little effect on the nervous phenomena. Of late the digestion has been good; attacks of flatulency and of enteralgia happen, however; the tongue is only at times coated, the bowels are regular.

Studying the case I found no organic disease of any organ; but ascertained that he passed habitually three pints of urine, of specific gravity of 1022, very acid, free from albumen and sugar, but loaded with lithates, and also containing at times a great deal of mucus. It often shows a considerable deposit of red sand, and when this happens to a marked degree his nervous symptoms previously very bad are strikingly relieved. So they usually are by repeated doses of calomel, which is apt to be followed for a few days by sand in the urine. When he has these abundant sediments of uric acid or the urates, a scalding in the urethra, a feeling as if water were passing from him, though none is passing, a constriction and burning back of the glans, a stinging at the orifice of the urethra; a feeling of pain above the pubes, are annoying symptoms of reflex character; and the uneasy feelings at the head of the penis are greatly aggravated by any irregularity in the time of his meals or in diet. This patient was placed on a diet of fish, green vegetables, a little oatmeal, milk, the white meats; he was directed to drink Apollinaris water freely, to exercise, and to give himself as much relaxation as was compatible with his pursuits. The bowels were kept soluble by Hunyadi-Janos or Friedrichshall water; a little calomel and sodium bicarbonate were occasionally prescribed, and, while the uric acid deposits were so marked, a course of citrate of lithium. He is very much better; but he is not as yet quite well; fresh anxieties and worries bring about relapses.

In concluding this examination of the nervous symptoms I must say something of the mental state. There are spells of languor and lassitude which befall the man whose blood is charged with lithic acid, in which all exertion is painful, and which strangely contrast with his usual energy. Then there is depression of spirits and gloom that may amount to melancholy. But above all is irritability of temper; odours annoy, sounds infuriate, nothing pleases, and it requires more than ordinary self-control

to prevent explosions of temper. The man is on edge, and the acid blood literally makes an acid temper. Indeed, many a man who has the reputation of being a curmudgeon, is simply a lithæmic who finds it impossible to control his engendered irritability.

Of the mental faculties the memory is the one which alone really suffers. It deteriorates markedly, especially after lithæmic vertigo. But in time as the lithæmia is kept away by a careful mode of life, it regains most of its original strength.

The mental state described may last for several years with only temporary periods of relief; or the horizon may at once be cleared by the discharge of large quantities of lithic acid in the lithæmic, as it is by an explosion of gout in the typically gouty. Macaulay's description of the Earl of Chatham's condition is, from a medical point of view, strictly correct. A cloud settled on him; he, a most affectionate father, could not bear to hear the voices of his own children. He bought up houses contiguous to his own, that he might not have neighbours to disturb him with their noise. His appetite was fanciful and capricious; he was melancholy, irritable. The disputes of his colleagues, the responsibility of state, bewildered this boldest of mén, who behaved at times like an hysterical girl, bursting into a flood of tears. He had passed months without a twinge of the gout to which he had been subject since boyhood. At length the gout returned. His nerves were newly braced, his spirits became buoyant; he was once more the proud, resolute statesman. *Nunquam poetor, nisi podager*, says Ennius of himself. The hard-drinking old Roman, fresh from his cups, sang the deeds of his sturdy forefathers only when an attack of gout had purified his blood and cleared his mental vision.

The symptoms of nervous derangement in lithæmia are interchangeable. Sometimes one or several exist for a time; the lithæmic condition gets better, they disappear; the lithæmic condition returns, but with it comes a fresh set of nervous symptoms; and so, until the state is permanently remedied, they may appear for years. Indeed, recurrence of lithæmia is one of its characteristics, and the nervous symptoms may be so persistent that it is difficult to set aside the thought that they are not due to an organic cause.

These nervous outbreaks frequently happen when the manifestations of hepatic and gastric disorder of lithæmia, except in so far as they are recognizable in the urine, are not very marked; indeed, I believe they are more common in this class of cases. Still we find more or less of these phenomena at times present: such as flatulent distension of the stomach and bowels, acid eructations, fulness at the epigastrium, and drowsiness after meals; a bitter taste in the mouth; flabby tongue coated at the back; capricious appetite; constipation, or, what is more significant, stools, from altered biliary secretions, either very dark or very light; short attacks of diarrhœa; passing slight jaundice; small ulcers in the roof of the mouth; hemorrhoids; palpitation of the heart with intermissions in its beat; throb-

bing of the great vessels; lumbago; itching erythematous or slightly scaly eruptions, like pityriasis, on the chest and between the shoulder-blades. Again, we may observe that the patient has great liability, as Murchison so well points out, to ordinary febrile colds, and to more severe local inflammations. Perhaps he has passed gall-stones or urinary calculi; or shows that tendency to degeneration of the tissues, especially of the vessels, which is one of the worst results of the lithæmic dyscrasia. Or his kidneys and his heart may become structurally involved; the heart making its affection manifest by association with the signs of high blood pressure in the arteries, its perverted rhythm, the accentuated second aortic sound, the growing evidence of hypertrophy and mural degeneration, in a manner so brilliantly described by Fothergill. But I repeat, these phenomena have no necessary connection with the nervous manifestations; nay, I think the latter are far more apt to exist when these organic conditions are not developed.

As so much in the recognition of lithæmia depends on the urine, I must say a few words about it. It may be, but it rarely is, copious. It is very generally scanty, deeply coloured, and of high specific gravity. It is very acid, readily deposits urates, of pink or brick-dust colour, and even crystals of uric acid. This state of urine exists more or less at all times, but a very large excretion of uric acid or its salts is apt to bring relief to the other symptoms. The pigment is increased in the urine; and under the microscope we commonly find the amorphous urates preponderating, more rarely well-formed crystals of uric acid, sometimes also oxalates. The urea is not increased, except in some instances, and in these loss of flesh is generally going on. Thus, in one case of the kind examined, the urine which was decidedly acid, had a specific gravity as high as 1035—in itself in the absence of sugar a suspicious circumstance,—was acid, deposited very abundant urates, amorphous under the microscope, had no free uric acid, but contained in 10 c.c. .4 grammes of urea, about double the ordinary amount.

If the other symptoms of lithæmia exist, we must not, from the absence of characteristic sediment, conclude against the increase of uric acid. This excess may be, it is known, present in clear urine, and only be determinable by chemical analysis. Indeed, in any doubtful instance we should resort to quantitative analysis, repeated on specimens obtained at different times. It would be well to make quantitative examinations in any case. But the processes are tedious and difficult in general practice. Pavy's estimation of uric acid by its reducing action upon the ammoniated cupric test (*Lancet*, April, 1880) promises best. Examinations of the blood, such as Garrod has made in persons with articular gout, have not to my knowledge been instituted in those affected merely with lithæmia. They would check off admirably the observations on the urine.

Lithæmia is much more common in men than in women. Its chief sufferers are men in the prime of life. It comes on in some who live.

luxuriously, eat largely, drink freely, take little exercise in the open air, and are indolent in their habits. But it is quite as often, or oftener, seen in the active brain workers of good habits; in the marked men in the community in which they live; and it is in them too, that the nervous symptoms of lithæmia are most obvious. My list of lithæmic patients embraces many a name distinguished at the bar, in medicine, in the pulpit, in literature, and in the world of finance. And it is not only brain-work, and all the habits this implies, but strain and worry, which induce it. Our present civilization is very rife with its causes. It is a growing disease in this country, especially in our cities. Malaria also excites it, or at least aggravates it; so do sexual excesses. It happens most often, certainly its nervous manifestations do, in persons of nervous temperament, and it is a diathesis which is readily transmitted. Disordered liver action with imperfect oxygenation of nitrogenous matter is supposed to be its cause, and to lead to the accumulation of uric acid and the urates in the blood. I am far from thinking that this theory covers the whole ground. The symptoms of nervous affection are, I firmly believe, the result of the waste-laden blood; but whether the lithic acid, or the compounds generating it, get into the blood in consequence only of deficient glandular action, as of the liver, is not so clear. Again, the disorder may be first excited by some disturbance of a nerve centre? We now hold as an established fact of science that puncture of the floor of the fourth ventricle causes diabetes. The ingenious reasonings of Dyce Duckworth are paving the way for the belief that in the medulla is a trophic centre for the joints, thus explaining the phenomena of articular gout. Is there also such a centre for causing lithic acid formation and lithæmia? But these are speculations not further here to be indulged in.

I must say one word as to the relations to gout. Gout itself is merely one of the results of lithæmia, and the consequences of a functional derangement of the liver, teaches Murchison; lithæmia is simply undeveloped gout, say others. I believe neither view is strictly correct. There is close relationship, and one predisposes, perhaps readily passes into the other. But we have lithæmia where not a typical symptom of unequivocal gout is to be found, not happening even during the lapse of years, and where there is no inherited gouty diathesis. If we take the characteristic features of gout to be the peculiar periodic recurrence of the joint-affection, we see at once the difference. A little aching in the knuckles or toes at times, in very few enlargement of a finger joint, are the only kindred features of lithæmia; and the diminution of uric acid in the urine for several days before the gouty paroxysm, the scanty excretion during it, the mere traces which, as Senator tells us, are found in chronic cases even between the paroxysms, are not analogous to the abundance of lithic acid or the lithates to be observed in lithæmia. There is a belief that gout is rare in this country; and typical gout certainly is comparatively rare. But lithæmia

is most common, and if it be true gout it is pre-eminently the American gout. As seen with us, it is an affection more often acquired than inherited.

The constitutional state, once established, lasts long, and is difficult to eradicate, although it is capable of being eradicated, or so nearly so, that it ceases to be troublesome. Still, under error in diet or fresh worries, relapse happens, and with it may return the nervous symptoms that are the subject of this paper. As to their treatment, the cases here reported have, I trust, made it apparent. But I may, in conclusion, summarize it: The main principle is, to treat the state, not the nervous symptoms themselves. The indiscriminate use of tonics and nervines which most of these patients are subjected to, is absolutely of harm. Nothing is accomplished until the lithæmia is struck at. In doing this, our most potent means is diet; without attention to it, other remedies are nearly valueless. The diet must be a sparing one, and I think that with those of enfeebled digestion the American plan of a substantial breakfast is best, for in the morning the digestive powers are usually strongest; the other meals must be very light. We diminish the work of the liver and kidneys by lessening the amount of highly nitrogenized food and of the hydrocarbons; hence beef and mutton, butter, cream, fat of meat, sugar in all forms are forbidden, and the less the patient takes of alcohol in any shape the better for him. Champagne is poison to most, a light claret is least objectionable, but water is the best drink for the lithæmic. Fish, oysters, fruits that do not contain much sugar, the green vegetables, except asparagus, are permissible; so are bread, wheaten meal, and oatmeal. Potatoes should be used in moderation, as they are mostly not well digested; eggs should be eaten sparingly. Poultry and the white meats are allowable; and with reference to other meats, although they are, strictly speaking, contraindicated, I find that, plainly cooked, they are well borne; the brain-worker especially requires them, and does better taking them than remaining on an unvarying diet without them. Fats and sugars are certainly far worse, and I have met with more than one case aggravated by taking the sweetish extracts of malt to strengthen the nervous system and the digestion.

Exercise is of importance next to diet, as active as possible without fatigue. Horseback exercise is admirable for persons who will take the time; and I have known the greatest advantage derived from the Swedish movements, especially from those that exercise the muscles of the trunk. Of course, full action of the skin is to be stimulated, and I generally make daily systematic skin friction, either after a shower bath or without it, part of my directions, and when it suits, also order an occasional Turkish bath. To live very constantly in the open air; to take a long mountain tramp or an ocean journey, are most useful prescriptions to persons who can comply with them.

Of medicines, those that stimulate excretory action by the bowels are the most advantageous; mercurials, and the saline purgatives do well for

the purpose in view, but the former at least are too wasteful of strength for frequent use; the nervous tone has to be kept up, not depressed. On the whole, the natural saline mineral waters answer best; and the Hunyadi-Janos, the Friedrichshall water, the Saratoga Congress water are most to be depended on. Nor is it only the purgative waters which are so useful; the drinking of those that tend to neutralize the uric acid by their alkalinity, and to act freely as diuretics, such as Carlsbad, Contrexeville, and Vichy water, or, in this country, the Capon spring water, the Saratoga Vichy, and the Poland water, are excellent; and the free drinking of a table water now much employed, the Apollonaris water, has been, I know, of marked use to many lithæmics. Citrate of lithium often does good, iodide of potassium and colchicum less often. Medicines of direct action on the nervous system I rarely prescribe, until at least the lithæmia is being broken up, or as a very subordinate part of the treatment; among these zinc and arsenic have seemed to me the most serviceable. Bromides may be employed for the nervousness and the sleeplessness, or to influence the headache after the vertiginous seizures. But the less often they, or chloral, are used the better. Remedies of the kind should be reserved for very special occasions. The way to relieve the nervous symptoms of lithæmia, I repeat, is to remove the lithæmia.

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